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ABSTRACT

A study compared elementary school students' classroom reading achievement levels to their chronological ages, sex, race, and parents' educational levels. Subjects were 168 children in grades one through four. The results indicated that reading levels did covary with parent education levels, with an additional effect of race indicated. No main or interaction effects of sex were found. Students of parents with education levels above high school performed relatively better in reading than did students of parents with education levels of high school or lower. Minority group students of parents in both education level groups performed poorly in reading in relation to the majority group students. Another finding was that from first through fourth grade the students' reading achievement scores fell more and more below the norm. This might be attributed to the increased complexity of reading skills required in the upper grades. (FL)

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Classroom Reading Performance of Children in Relationship to Age Differences Within Grades

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Running Head: Reading Performance and Age

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Classroom Reading Performance of Children in Relationship to Age Differences Within Grades

Reading achievement of school aged children has been the focus of a wide range of educational research. While the ability to read consists of a multiplicity of cognitive and perceptual skills, in this article reading achievement is considered as a unitary concept. Previous reviews of the subject spanning several decades have considered reading performance in relation to a number of contributing factors. Among the variables associated with reading achievement are socioeconomic status (SES), family size, race, sex, teaching strategies, and performance on standardized intelligence tests.

The purpose of the present analysis is to compare primary students' classroom reading achievement levels to the students' chronological ages, sex, race, and parents' educational level. In light of the authors' clinical observations suggesting that relatively younger children in a given grade level tend to perform below expectancy in reading, further investigation was initiated to explore the interrelationships among these variables.

Few indications are available in the recent literature of direct comparison studies between younger and older children within the same grade level on the basis of reading

achievement. A fourteen-year decline in average scores on college entrance examinations like the Scholastic Aptitude Test has raised many questions and produced research efforts at comparisons of today's student with the student of twenty or more years ago (4). The majority of these studies conclude that schools are more effective now than ever in reducing functional illiteracy (5).

The relationship between chronological age and reading performance has most often been approached through studies of children's development of linguistic and phonological skills. While linguists claim that the major part of language acquisition takes place between the ages of one and four, children entering school do not have the same linguistic abilities as do adults. Numerous investigators have also shown that significant language development occurs after the age of five or six (7, 11, 8, 9, 10).

While N. Chomsky (2) stated that six-year-olds have sharp ability to discriminate among phonetically close stimuli, Chomsky and Hall (3) and C. S. Chomsky (1) noted that the acquisition of phonology (i.e., the relationship of individual sounds to symbols) is not entirely mastered by the age of six (first grade). Language development and specifically the acquisition of phonology is of particular importance in the proposed study, given the highly phonetic approach inherent in the Houghton-Mifflin reading series used by the target school system.

Fogleman and Goldstein (6) investigated the relationship between achievement in reading and math and changes in the variables of social class and family size. For a given seven-year-old in their study, changes in achievement at the eleven year level were associated with changes in social class and family size. The role of SES in academic performance has been a long-standing component in past research. Turman and Oden (12) noted that gifted children from homes of above average occupational and educational status acquired reading skills prior to entering school.

Given the gradually developing maturational aspects of phonology acquisition and the phonological components of elementary reading skills, an hypothesis of the current investigation is that chronologically younger children within a grade level would be deficit to chronologically older children within the same grade level. Further, it is hypothesized that this deficit reading performance in relation to age would more likely hold true in the first and second grades, because maturational differences in these areas tend to be more obscure beyond the ages of seven or eight. Consistent with previous research results, a second hypothesis is that reading progress will covary with parent education level.

Method

The subjects were 168 urban and suburban elementary school-aged children in grades one through four, attending

two public schools in the Piedmont area of the state of North Carolina. Of the total group, 106 were Euro-American and 62 were Afro-American; there were 77 males and 91 females. The mean age of the first graders was 6 years and 7 months; of the second graders 7 years and 5 months; of the third graders 8 years and 6 months; and of the fourth graders 9 years and 7 months.

Two first grades, two second grades, two third grades, and two fourth grades were randomly selected for collection of data. The children in each of the classes had previously been placed in their homerooms on a heterogenous grouping basis, with no regard for strict ability grouping. They were originally selected to approximate proportionate ratios of sex and of race in accordaace with the established 70 (majority) : 30 (minority) ratio of the target school system. Since the classes were chosen at random and the mean group IQ score was 102, the assumption was made that ability, as measured by group assessment, was normally distributed in the sample.

Procedure

The following data were collected on each subject: a grade-level equivalent of classroom reading performance in the Houghton-Mifflin reading series (used system-wide in the Winston-Salem/Forsyth County Schools) as of September 1, 1979; date of birth, sex, and race. In addition, a letter was sent to each child's parent(s), briefly explaining the study and

asking for the last grade of formal education of both mother and father. An 89 percent return of this information was realized, so of the original 201 students in these eight classes, the 168 subjects with all information available were included in the final results. Two parents of children on the original list refused permission to have data on their children included in the study.

Following data collection, the 168 subjects were divided into artifical grade level groups on the basis of age; those students who were 5-10 through 6-9 in the first grade grouping, 6-10 through 7-9 in the second grade grouping, 7-10 through 8-9 in the third grade grouping, and 8-10 through 9-9 in the fourth grade grouping. Of the 168 subjects, a total of 28 students had been retained in one grade, 16.7 percent, but these were placed in the correct "grade group" on the basis of age, regardless of retention, since the reading series used in comparison data is a continuous progress series, irrespective of grade placement.

Each grade group was further subdivided into trimesters, as the first third (and youngest group) with birthdates from July 16 through October 15, the next third (and middle group) with birthdates from March 16 through July 15, and the latter third (and oldest group) with birthdates from October 16 through March 15.

Results

A 3 (Trimester) X 4 (Grade) analysis of variance performed

on the data revealed a significant effect of Grade, F (3, 156) = 4.02, $p < .01$, and a significant interaction between Grade and Trimester, F (6, 156) = 2.80, $p < .01$. The effect of Grade involved decreasing mean reading achievement levels for progressively higher grades. The interaction of Grade and Trimester revealed a decrease in reading for younger children and an increase for older children between the third and fourth grades.

Insert Figures 1 and 2

A 2 (Sex) X 2 (Race) analysis of variance performed on the same data indicated a significant effect of Race, F (1, 164) = 12.17, $p < .01$, with minority children exhibiting consistently lower reading achievement levels. Subsequent to this effect, a 2 (Parent Education Level) X 2 (Race) analysis of variance was performed, indicating that in addition to the effect of Race, there is a significant effect of Parent Education Level on reading achievement levels, F (1, 164) = 4.0, $p < .05$. Students' reading achievement levels increased with increasing Parent Education Levels. Low Parent Education Level is

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Insert Figure 3

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operationally defined as twelve or less years of formal school education, whereas high Parent Education Level is defined as thirteen or more years of formal school education.

All of the above analyses of variance were calculated using a Harmonic unweighted mean procedure to correct for unequal

cell frequencies.

Pearson-product moment correlations were computed for mean parent education level and reading achievement level for each grade group. Results indicated significant correlations between these measures at each grade level (first grade $r = .850$, $p < .01$; second grade $r = .597$, $p < .01$; third grade $r = .449$, $p < .01$; and fourth grade $r = .790$, $p < .01$).

Discussion

While it was predicted that relatively younger children would be deficit in reading in relation to older children within the same grade level, the results support this hypothesis only at the fourth grade level. The hypothesis did not hold for first and second grades as originally predicted. One possibility is that there may have been a "floor effect", particularly in the first grade, since measured reading achievement levels in first grade all begin at the 1.0 level, or beginning first grade for children entering school beyond the Kindergarten level.

As was also predicted, reading levels did covary with parent education levels, with an additional effect of race indicated. No main or interaction effects of sex were found.

To some extent, the present findings replicate Fogleman and Goldstein (6) using parent education level as an indicator of SES. Students of parents with higher level education (above high school) performed relatively better in reading than students of parents with lower education (high school or below). The

relationship of race to parent education level is graphically presented in Figure 3. Minority students of parents in both education level groups perform poorly in reading in relation to majority students. While a statistically significant interaction between parent education level and race was not found, there appears to be a trend toward higher reading achievement in majority students of parents with higher educational levels, but this is not the trend with minority students. This difference between majority and minority groups may be partially a function of the division of parent education levels into high-low groups, without the finer discrimination of a third or even fourth breakdown.

While Chomsky (1) and other researchers seem to have viewed some aspects of language development as not yet complete by the age of five or six, it is possible that skills of reading other than those subsumed under phonological acquisition do not become integrated into meaningful reading until the ages of eight or nine (third or fourth grade). As Figure 2 indicates, the first trimester group (relatively younger students) shows a gradual decline from the first through third grades, and a sharp decline from third to fourth, which may be associated with the introduction of an increased emphasis upon comprehension and inference skills such as literal comprehension, meaning acquisition, and interpretative thinking. Emphasis in earlier grades lies more in the areas of decoding, including those skills directly related to phonological acquisition. The decline in the reading

levels of this younger group is in contrast to the relatively consistent reading performance of the oldest group of students; they may not experience the same difficulty with comprehension and related skills because of maturational differences.

Another variable considered plausible in influencing lowered reading achievement in the minority group independent of parent education level is differing expectations and/or teaching approaches used with minority children. Different patterns of language acquisition in preschool years among minority children may be an additional contributing variable, especially in view of the heavy emphasis on phonological components of the Houghton-Mifflin series in the early grades.

An unexpected finding (Figure 1) was a linear decrease in reading achievement levels from first through fourth grades. One contributing factor might be the aforementioned increased complexity of reading skills required with increasing grades. Decreasing motivation for school and academic achievement may also be an additional factor. If could be speculated that the difficulty levels of this Houghton-Mifflin series are associated with this progressive decrease as well.

In light of the possible "floor effect" discussed previously, further research might include measures of reading readiness. This wider range of available data would allow for finer discriminations among age groups at the lower grade levels. Since the greatest changes in reading performance relative to age occurred between grades three and four, further investigation

into grades five and six should be the focus of future research. In addition, children entering the first grade in the three or four months just prior to a school's entrance cut-off date should be monitored carefully to and beyond the fourth grade level in reading skills.

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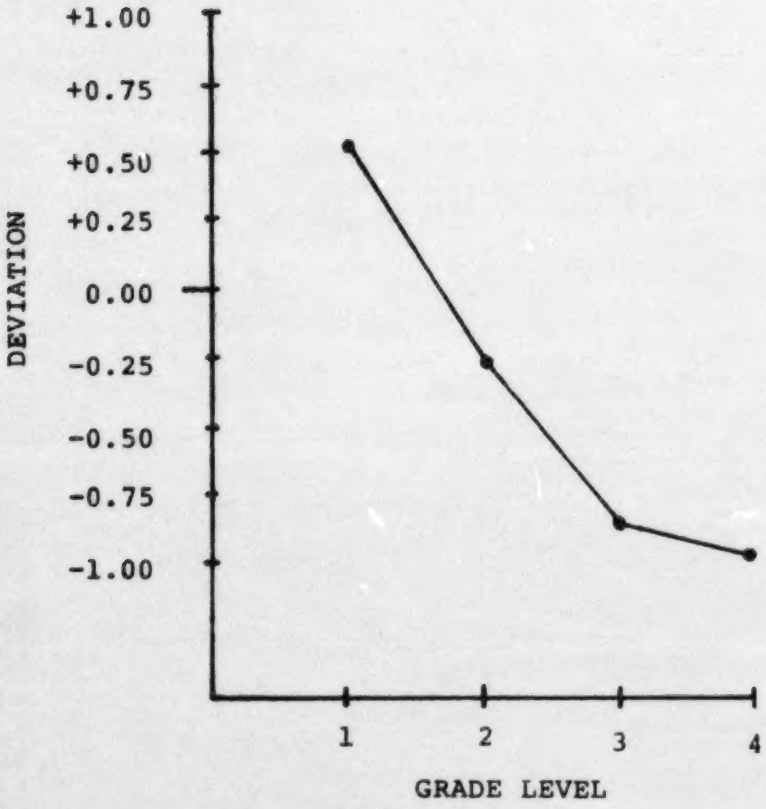

Figure 1. Deviations from grade-appropriate reading level (0.0) for students in grades 1 through 4.

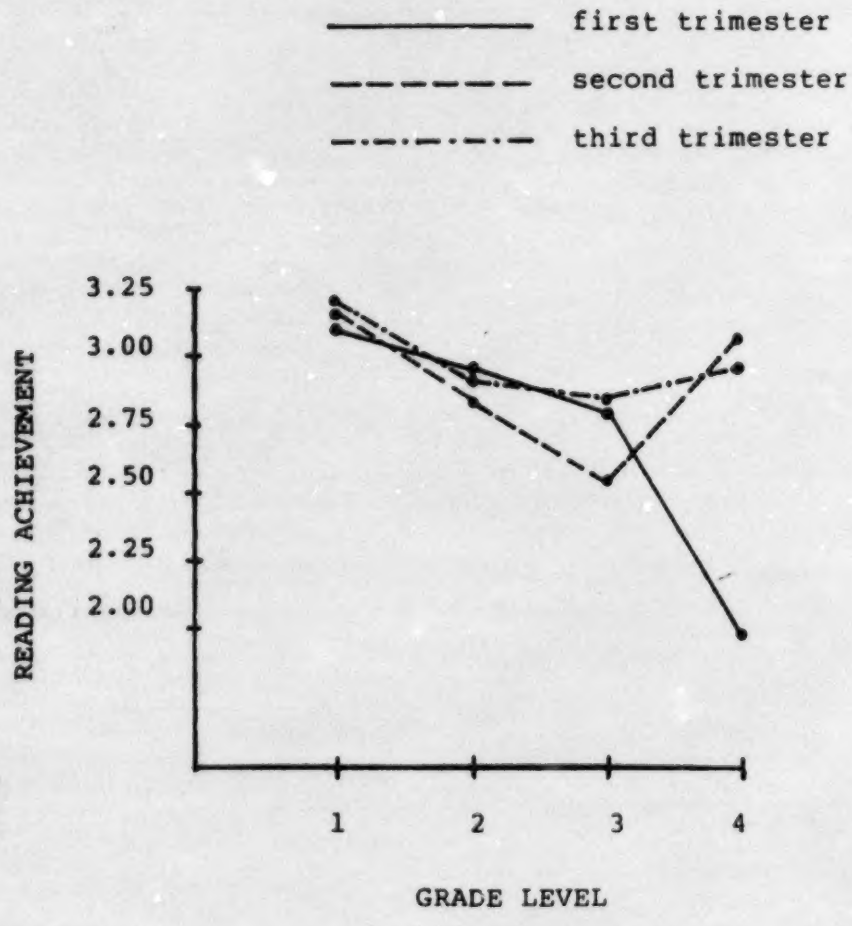

Figure 2. Mean reading achievement for first, second, and third trimester students in grades 1 through 4.

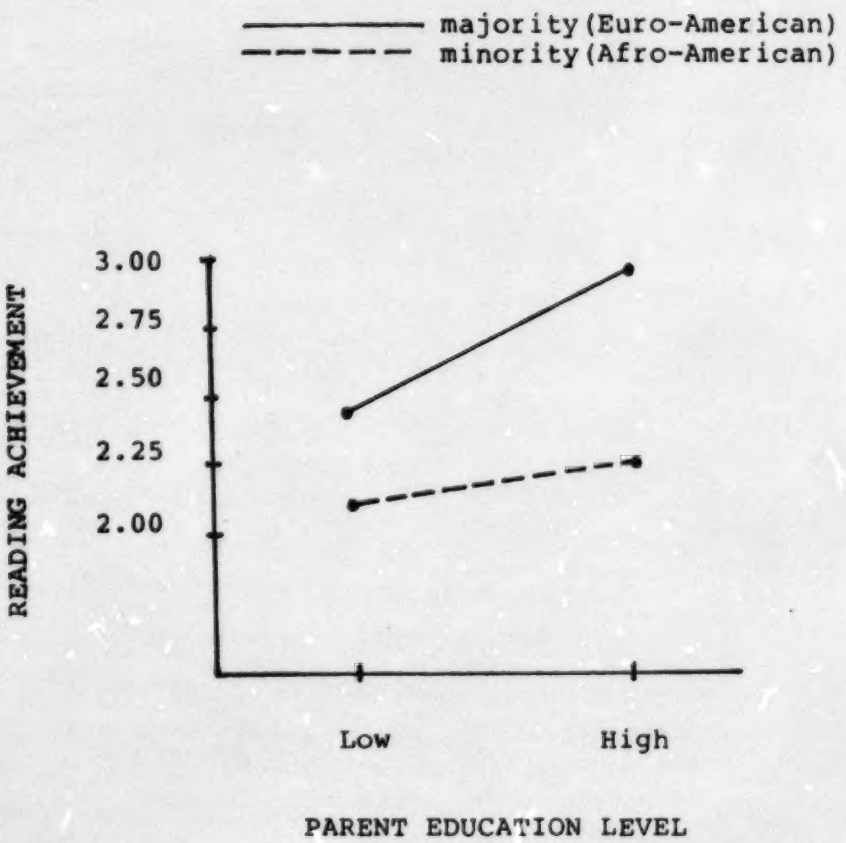

Figure 3. Mean reading achievement for majority(Euro-American) and minority (Afro-American) students of parents of low and high education levels.